BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G50.215.2
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AT&T Co Standard

CABLE TESTING — GENERAL
IDENTIFYING CABLE PAIRS
MURPHY CABLE TESTER

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1. GENERAL

1.01 This section covers the method of identifying cable pairs in non-working cables by one man using the Murphy Cable Tester.

1.02 The Murphy Cable Tester consists of an ohmmeter equipped with a buzzer (Model C Meter) and a Terminal Board or a Combination Tag and Terminating Board; these components are illustrated in Part 2.

1.03 The tester is intended primarily for identifying conductors in cables containing 101 or less pairs, as only two digit numbers can be identified by the meter. However, pairs in larger cables can be identified by terminating the pairs in 101-pair groups using the color code or the position of the units in the cable to indicate the hundreds groups. In large cables it will be necessary to use lead wires to connect the tip and ring groups to the binding posts of the terminal.

1.04 Only one man should identify pairs in a 101-pair group at a time. Pairs in another hundred group in the cable can be tested simultaneously by terminating the pairs of the hundred group in another terminal board.

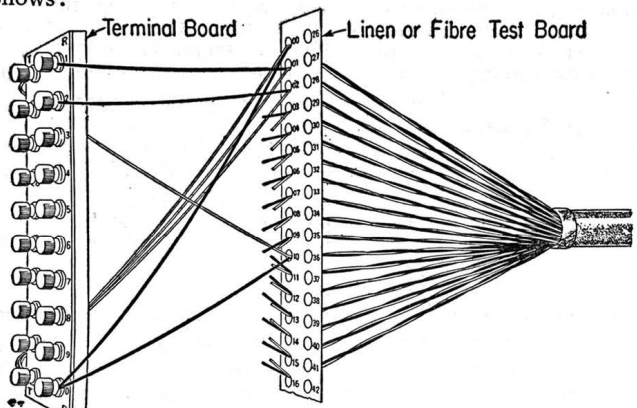
2. BOARDING CABLE PAIRS

2.01 Clear the conductors at the far end and wrap the end to keep the conductors dry.

2.02 At the end to be spliced to the feeder cable, terminate the conductors in a Terminal Board or a Combination Tag and Terminating Board, as outlined below.

2.03 **Terminal Board:** Remove about two feet of sheath from the end of the cable and place the pairs in splicer's linen or fibre testboards according to the count of the pairs. Separate the tip and ring wires of each pair up to the testboards and remove about 2-1/2 inches of insulation from the end of each wire.

2.04 Terminate the conductors on the binding posts of the Terminal Board, illustrated in the sketch below, as follows:



Note:-Other wires omitted for clearness

(1) Connect the tip wires of pairs 01, 02, 03, etc., and pair 100 to the T (tip) post on the left-hand side of the board designated 0.

(2) Connect the tip wires of pairs 10, 11, 12, 13, etc., to the T post designated 1.

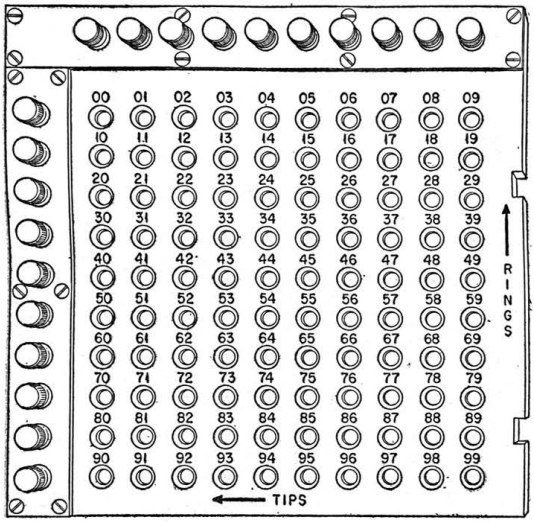
(3) Connect the tip wires of pairs 20, 21, 22, 23, etc., to the T post designated 2. Continue in this manner until all the tip wires, except that of the tracer pair, are terminated.

(4) Now connect the ring wires of pairs 01, 11, 21, 31, etc., to the R (ring) post on the right-hand side of the board designated 1.

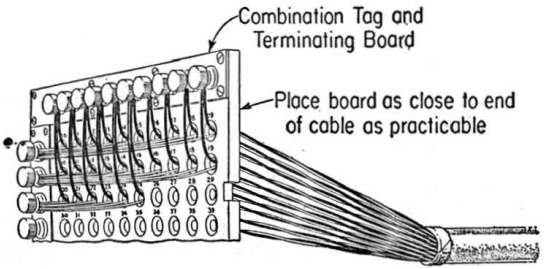
(5) Connect the ring wires of pairs 02, 12, 22, 32, etc., to the R post designated 2. Continue in this manner until all ring wires, except that of the tracer pair, are terminated.

(6) Connect the tip wire of the tracer pair to the T post designated 0 and the ring wire to the R post designated 0 regardless of the actual number of the pair. The ring wire of pair 100 should also be connected to R post designated 0.

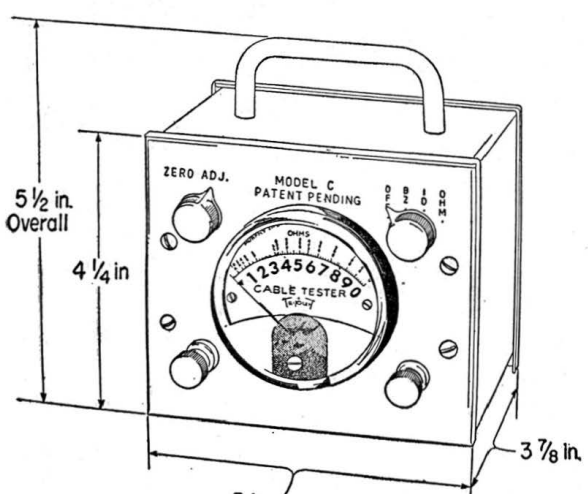
2.05 **Combination Tag and Terminating Board:** This device is illustrated in the sketch below. The 100 holes in the board are numbered 00 to 99. The 10 binding posts on the left-hand side are for terminating the tip (T) wires and the 10 posts along the top for terminating the ring (R) wires.



2.06 Terminate the pairs on the board as follows: Remove about 2 feet of sheath from the end of the cable. Thread the pairs through the holes placing the tracer pair regardless of its actual pair number (as well as pair 100) in the hole designated 00. Separate the tip and ring wires of each pair. Combine and terminate the tip wires of pairs 00, 01, 02, 03, etc., on the T post designated 0 on the left-hand side of the board, as shown in the following sketch. Next combine and terminate the tip wires of pairs 10, 11, 12, 13, etc., on the T post designated 1. Continue in this manner until the tip wires are terminated. Then combine and terminate the ring wires of pairs 01, 11, 21, 31, etc., on the R post designated 1 at the top of the board. Continue in this manner until all ring wires are terminated.



2.07 Determine whether there is a conductor fault in the cable which will interfere with identification, as follows: Connect the ohmmeter illustrated below, to the T and R posts designated 0. Turn the zero adjustment (ZERO ADJ) knob until the meter reads 0. Remove the meter lead to the T post and connect this lead, in turn, to each post. The meter reading should correspond to the number of the binding that is being touched. If the reading differs, a cross is indicated. The fault must be cleared or the wires in trouble must be disconnected from the board before pairs can be identified.



2.08 Disconnect the meter and wrap the end of the cable enclosing desiccant in the wrap to maintain the insulation resistance of the conductors.

3. IDENTIFYING PAIRS

3.01 At the splice connect one side of the meter to the tip side of the tracer pair and the other to the ring side of the tracer. Set the four-position switch at ID. Turn the ZERO ADJ knob until a 0 reading is obtained. This adjustment compensates for the resistance in the tracer pair to the testboard and also for aging of the dry battery.

3.02 Remove the lead from the tip wire of the tracer pair and substitute a needle point test pick for this lead.

3.03 Connect the test pick to the tip side of a pair to be identified. The meter will read the TENS digit of the pair. Then connect the pick to the ring side of this pair and the meter will read the UNITS digit. For example: If the meter reads 4 when the tip wire is contacted and 3 when the ring wire is contacted, the number of the pair is 43. Pair 1 will read 01, pair 2, 02, etc. Even hundred pairs (100, 200, etc.) will read 00 as will the tracer pair.

3.04 **Precaution:** In testing polyethylene insulated conductors, a one inch length of D Vinyl Tape shall be wrapped around each conductor at the point where the insulation was pierced with the needle point test pick unless the puncture is covered by a sleeve.

4. FINAL TEST—DEFECTIVE PAIRS

4.01 After the cable terminals have been spliced, tests for grounded, short and crossed wires are made as follows:

(a) Grounds: Ground one side of the meter and with a lead connected to the other post of the meter, contact the posts on the testboard. A meter reading indicates a grounded pair.

(b) Shorts and Crosses: Connect one post of meter to one of the 0 binding post and with electrician's scissors connect to the other post, cut one wire at a time from the terminal. If a cross or short exists between the wire under test and another wire, the meter will indicate the binding post number of wire. No reading indicates the conductor is clear.

4.02 Test the terminations to ensure that no pair has been transposed.

5. BUZZER AND OHMMETER TESTS

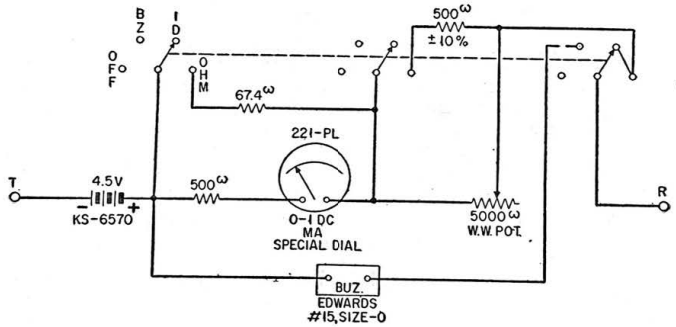
5.01 **Buzzer Test:** With the four-position switch set at BZ, the pairs in terminal stubs can be identified. Connect one post of the meter to a post in the terminal and the other side to a scissors or test pick to contact the wires.

5.02 **Ohmmeter Test:** The ohmmeter test is used to indicate the approximate location of a ground, short, or cross. The meter is so designed that 500 ohms is near the center of the scale. When using the ohmmeter, the meter should be adjusted to zero ohms with the four-position switch set at OHM and the test leads are shorted. The leads are then connected to the circuit to be measured and the meter read.

5.03 The switch should be set at OFF position when the meter is not in use to minimize discharge of the batteries in the event that the test leads are left connected to the meter and become shorted.

6. CIRCUIT DIAGRAM

6.01 The circuit diagram of the ohmmeter is shown below.



NOTE:- ALL RESISTORS ±1% UNLESS STATED